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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/724,551

11/28/2003

Eliseo R. Ranalli

RANALLI-3

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02/08/2005

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EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,551

Applicant(s)

RANALLI, ELISEO R.

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/28/03</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on November 28, 2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Objections

2. Claims 1-9 are objected to because of the following informalities:

(1). The phrase "quasi-periodic echelle grating structure" recited in claim 1 is confusing and indefinite since it is not clear what is considered to be the "quasi-periodic echelle grating structure", that is to say it is not clear what is being "quasi". The phrase "the desired impulse response, and the phrase "said impulse resolution coefficient" recited in claim 1 is confusing and indefinite since they each lacks proper antecedent basis.

(2). The term "the nominal spacing" recited in claims 1, 4, and 7 are confusing and indefinite since it is not clear what is considered to be the "nominal spacing" and the spacing between what.

(3). A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not

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required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 1 recites the broad recitation “a desired narrow band optical transfer function” and the claim also recites “the Fourier transfer of the desired impulse response” which is the narrower statement of the range/limitation.

(4). The phrase “the selected filter bandwidth”, the phrase “said selected transfer function” recited in claim 7 are confusing and indefinite since they each lacks proper antecedent basis from earlier part of the claim.

(5). The phrase “the number of facets” recited in claims 1, 4, 7 and 10 are confusing and indefinite since it is not clear what does this number really referred to. For the examination purpose the “number of facets” is being read as “the number of facets being illuminated”. The applicant is respectfully requested to amend the claims to specifically state such if this is the meaning of “number of facets”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1-3 and 10 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase “the free spectral range of the optical device” recited in claim 10 is confusing since it is not clear if this is the same free spectral range recited earlier in conjunction with the desired narrow-band optical transfer function. The phrase “the desired spectral resolution W of the response of the optical device” recited in claim 10 is confusing since it is not clear what is considered to be “the

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response” of the optical device. It is not clear if this is the same as the optical transfer function or not. The phrase “the desired optical impulse response” recited in claim 10 is confusing and indefinite since it is not clear how does it relate to earlier recited “response of the optical device”. The phrase “a size corresponding to an (or the) amplitude of said (or the corresponding) impulse response coefficient” recited in claims 1 and 10 is confusing and indefinite since the phrase the “the corresponding impulse response coefficient” lacks proper antecedent basis from earlier part of the claim and also it is not clear how can the size of the facet being “corresponding to an amplitude of an impulse response coefficients. What are these coefficients? The phrase “position corresponding to (or based upon) a (or the) phase of the corresponding impulse response coefficient” recited in claims 1 and 10 is confusing and indefinite since it is not clear where does this *phase* information come from and how could the position of the facets being determined by a phase information. These indefiniteness and confusions make the scope of the claims unclear.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 4-9 are rejected under 35 U.S.C. 102(e) as being anticipated by the patent issued to Sappey et al (PN. 6,647,182).

Sappey et al teaches a *échelle grating dense wavelength division multiplexer/demultiplexer*, that severs as the *optical system* or the *optical filter* for realizing a selected *optical transfer function* and *optical impulse response* for narrow-band incident optical signals, wherein the system or the filter is

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comprised of an *input waveguide with single mode fibers* (14, Figure 1) and *output waveguide with single mode fibers* (16) over the wavelength range of interest, that serves as the *entrance* and *exit apertures*, an *echelle grating* (20) having *selected number of reflective facets*, *nominal grating line spacing* (d), wherein the number of the facets being *illuminated* (N), the *size* of the facets, (b), and *positions* of the facets are implicitly selected to approximate the *optical transfer function* defined by the optical system or filter. It is known in the art that an *optical transfer function* is defined as the “optical action” performed on the incident optical signal by the optical system. In this case, Sappey et al teaches that the system is a *wavelength division multiplexer/demultiplexer*, this means the optical system or filter has the functions of *demultiplexing* the input optical signal from the input waveguide into *multiple channels of different wavelengths* via the *diffraction* of the optical signal by the *echelle grating* and focused the different wavelength channels into output fibers in the output waveguide, (please see column 5-10). A certain optical transfer function is defined by such system and filter and since the *grating structure* of the echelle grating is *essential* for diffracting the input optical signal into multiple wavelength channels, *structures of the facets, (including the size, the position, spacing or period and the number of the facets being illuminated)* of the echelle grating therefore are essential for defining the optical transfer function as described by Sappey et al (please see columns 5-8). Sappey et al further teaches that a *collimating lens* (18) is used to collimate the input optical signal to the echelle grating, (please see Figure 1 and column 5, lines 8-62).

With regard to claims 6 and 9, the single mode fibers in the input and output waveguides (14 and 16) are arranged in a pigtail harness (12) and the waveguides are slab type waveguide that confines the fibers in at least one direction.

This reference has therefore anticipated the claims.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Sappey et al.

Sappey et al teaches a *echelle grating dense wavelength division multiplexer/demultiplexer*, that serves as the *optical device* for achieving a selected *optical transfer function* and *optical impulse response* for narrow-band incident optical signals, wherein the device is comprised of an *input waveguide* with *single mode fibers* (14, Figure 1) and *output waveguide* with *single mode fibers* (16) over the wavelength range of interest, that serves as the *entrance* and *exit apertures*, and an *echelle grating* (20) having a *plurality of contiguous reflective grating facets* with *nominal grating line spacing* (d, please see Figures 1 and 2), wherein the number of the facets being *illuminated* (N), the *size* of the facets, (b), and *positions* of the facets are implicitly selected to approximate the *optical transfer function* defined by the optical device. Sappey et al teaches that the echelle grating is designed to have a *desired* free spectral range (FSR, please see column 7, line 5), which is a function of the diffraction order, m. This means that the free spectral range is determined by the diffraction property of the echelle grating and it is basic theory of the diffraction that the diffraction property is determined by the grating spacing the grating lines. It is also known in the art that an *optical transfer function* is defined as the “optical action” performed on the incident optical signal by the optical system. In this case, Sappey et al teaches that the device is a *wavelength division multiplexer/demultiplexer*, this means the optical device has the functions of *demultiplexing* the input optical signal from the input waveguide into *multiple channels of different*

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wavelengths via the *diffraction* of the optical signal by the *echelle grating* and focused the different wavelength channels into output fibers in the output waveguide, (please see column 5-10). A certain optical transfer function is therefore defined by such device and since the *grating structure* of the echelle grating is *essential* for diffracting the input optical signal into multiple wavelength channels, *structures of the facets, (including the size, the position, spacing or period and the number of the facets being illuminated)* of the echelle grating therefore are essential for defining the optical transfer function as described by Sappey et al (please see column 5-8). Although Sappey et al does not teach explicitly that the of the number of facets being illuminated (N) is determined by the spectral resolution of the transfer function and does not teach explicitly that the facet size and position are determined by the impulse response at a selected delay, i.e. the inverse Fourier transformation of the optical function, however it is *implicitly true* that the number of facets being illuminated (N) is an essential factor for determining the *spectral resolution* of the optical transfer function and it is implicitly true that the number of facets being illuminated (N) in the echelle grating of Sappey et al must have a *corresponding* spectral resolution in the optical transfer function defined by the optical device. Furthermore, the Fourier transformation relationship between optical transfer function and the desired impulse response is a *set mathematical relationship* in the art, it is therefore implicitly included in the echelle grating and the optical transfer function and it is also an obvious modification to one skilled in the art to use such information to design the facet size and positions of the echelle grating for at least the purpose of making the echelle grating achieves certain desired optical transfer function. The selected delay as recited in the claims is referred to the time spacing between the optical signal hitting the adjacent facets, which is implicitly included in the grating design disclosed by Sappey et al. With regard to claim 10, the method for determining the echelle grating is included in the disclosure of Sappey et al. Although this reference does not teach explicitly that the relationship between the spectral resolution for the response of the device, the free spectral range and the number of facets illuminated, however such relationship is implicitly included since the number of the

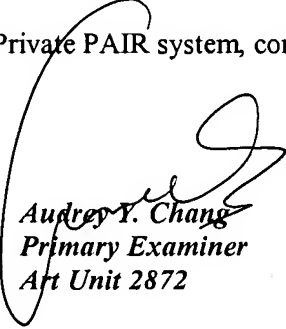
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facets illuminated and the free spectral range, (which is determined by the diffraction property of the echelle grating), determine the spectral resolution which is also a result of the diffraction property of the echelle grating.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Audrey Y. Chang
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.